SMITH AND MOREHOUSE RESERVOIR

Introduction

Smith and Morehouse Reservoir is in the upper reaches of the Weber River drainage in the western High Uintas. This area of the Uintas is popular during the summer, as it is relatively close to population centers on the Wasatch Front. It is in a narrow, north-facing canyon that stays cooler and moister than other areas. The reservoir was enlarged in 1987, quintupling its capacity.

Characteristics and Morphometry

Lake elevation (meters / feet)	2,426 / 7,960
Surface area (hectares / acres)	17.8 / 44
Watershed area (hectares / acres)	8,314 / 20,545
Volume (m^3 / acre-feet)	
capacity	1,667,600 / 1,360
conservation pool	0
Annual inflow (m^3 / acre-feet)	
Retention time (years)	
Drawdown (m^3 / acre-feet)	1,667,600 / 1,360
Depth (meters / feet)	
maximum	9.23 / 30.3
mean	
Length (meters / feet)	975 / 3,199
Width (meters / feet)	244 / 801
Shoreline (meters / feet)	2,130 / 6,989

The shoreline is owned by the Wasatch-Cache National Forest, and public access is unrestricted. In addition to recreation water use is for both irrigation and culinary purposes, with a greater fraction being used for culinary as population increases along the Wasatch Front.

Location

County	Summit
Longitude / Latitude	110 06 09 / 40 45 31
USGS Map	Erickson Basin, UT , Slader Basin, UT 1972
DeLorme's Utah Atlas & Gazetteer™	Page 54, B-2
Cataloging Unit	Upper Weber (16020101)

Recreation

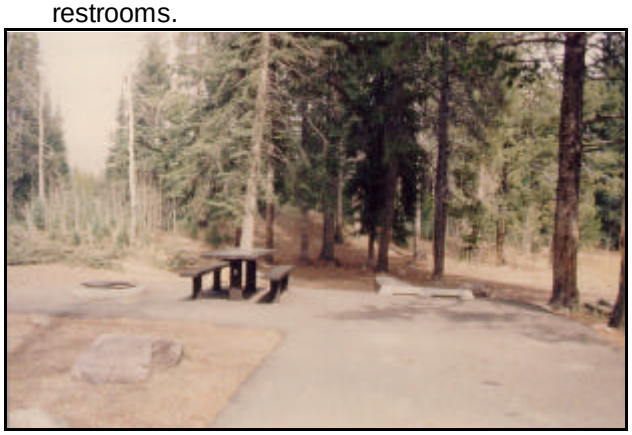
Smith and Morehouse Reservoir is east of Oakley on the paved road that follows the Weber River. The route is well marked from Oakley.

Fishing, camping, picnicking, scenic beauty and hiking are all popular. There is a boat ramp, and the reservoir is popular for water recreation, although it is quite cold for swimming.

File Contains Data for PostScript Printers Only

The area receives heavy recreational use throughout the summer. The paved road up the Weber River is plowed during the winter, and the reservoir is accessible by cross-country ski, snowshoe, or snowmobile from the paved road approximately 2 miles south on FR-33.

The campground at the lake was inundated when the dam was raised, but campgrounds are currently available both above and below the reservoir. They provide campsites, with picnic areas, drinking water, and restrooms.



Limnological Data

Data sampled from STORET site: 592396

Surface Data	1981	1989	1991
Trophic Status	M	M	M
Chlorophyll TSI	-	45.25	44.68
Secchi Depth TSI	50	48.09	57.37
Phosphorous TSI	37	39.67	35.82
Average TSI	43.5	44.34	45.96
Chlorophyll a (ug/L)	-	4.5	4.2
Transparency (m)	1.8	2.3	1.2
Total Phosphorous (ug/L)	5	12	9
pH	8.4	8.1	7.4
Total Susp. Solids (mg/L)	<5	-	5
Total Volatile Solids (mg/L)	-	-	4
Total Residual Solids (mg/L)	-	-	<2
Temperature (°C / °f)	8/46	14/58	13/56
Conductivity (umhos.cm)	28	48	47
Water Column Data			
Ammonia (mg/L)	0.1	0.01	0.03
Nitrate/Nitrite (mg/L)	0.18	-	0.02
Hardness (mg/L)	16	-	24
Alkalinity (mg/L)	13	-	18
Silica (mg/L)	-	-	2.4
Total Phosphorous (ug/L)	7.5	15	6
Miscellaneous Data			
Limiting Nutrient	P	N	N
DO (Mg/l) at 75% depth	8.3	6.9	5.2
Stratification (m)	1-2	10-12	5-10
Depth at Deepest Site (m)	7	13.5	11

Watershed Description

The watershed is quite small, almost visible in its entirety from the reservoir. The watershed high point, Moffit Peak, is 3,354 m (11,003 ft) above sea level, thereby developing a complex slope of 18.9% to the reservoir. There are at least four small, perennial streams entering the lake, the average gradient being 4.0% (210 feet per mile). The inflows drain small natural lakes in the watershed, many of which are beaver ponds rather than glacial lakes. Beaver activity probably modifies the drainage such that water flows in these streams year round, rather than only during spring and summer runoff. There are 4 major upstream lakes in the watershed.

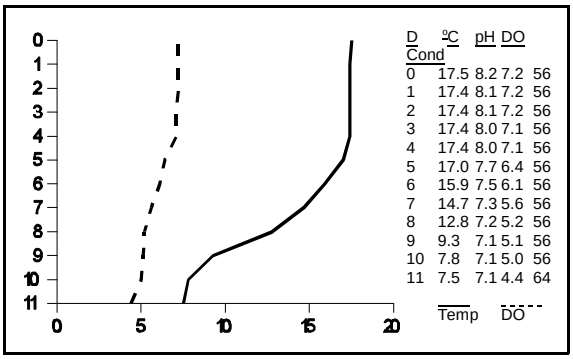
The watershed is made up of high mountains, lakes, meadows, and rocky outcroppings. The soil associations that compose the watershed are listed in Appendix III.

The vegetation communities consist of marshes, pine, spruce-fir, aspen, oak, maple, and alpine. The watershed receives 64 - 102 m (25 - 40 inches) of precipitation annually. The frost-free season around the reservoir is 0 - 40 days per year.

Use of the watershed is 100% multiple use with grazing and recreation the dominant uses.

Limnological Assessment

The water quality of Smith and Morehouse Reservoir is very good. It is considered to be very soft with a hardness concentration value of approximately 20 mg/L (CaCO3). Although there are no overall water column concentrations that exceed State water quality standards occasional low dissolved oxygen concentrations are observed as indicated in the August 27, 1991 profile. Although these conditions do not indicate a sever impact to water quality, investigations are needed to determine the severity of dissolved oxygen depletion during winter ice coverage conditions. is not there are reported violations of parameters near the bottom of the lake. These parameters include phosphorus, dissolved oxygen



D	°C	pH	DO	Cond
0	17.5	8.2	7.2	56
1	17.4	8.1	7.2	56
2	17.4	8.1	7.2	56
3	17.4	8.0	7.1	56
4	17.4	8.0	7.1	56
5	17.0	7.7	6.4	56
6	15.9	7.5	6.1	56
7	14.7	7.3	5.6	56
8	12.8	7.2	5.2	56
9	9.3	7.1	5.1	56
10	7.8	7.1	5.0	56
11	7.5	7.1	4.4	64

and pH. At various times of the year the hypolimnion of the lake the oxygen deficiencies develop. Most of the occurrence are noted during the first monitoring trip usually in June. It may be that anoxic conditions developed during the winter are still exerting an influence in lower depths of the reservoir. There are also some low values reported during late summer. These values typically are in the 2-3 mg/L range. Total phosphorus values reported in the hypolimnion are slightly higher than the recommended pollution indicator value of 25 ug/L with values reported in the range of 40 ug/L. The pH values have dipped to a low of 5.2 on one occasion. Although these exceedences have occurred, it does not appear that the water quality is significantly impaired. It does indicate that some winter monitoring should be conducted to determine if impairments are present during extended ice coverage conditions during the winter.

Although the reservoir was classified as a phosphorus limited system in 1981, current data suggest that the reservoir is nitrogen limited. TSI values indicate the reservoir is mesotrophic in a state of moderate productivity. The reservoir does stratify as indicated in the profile.

According to DWR no fish kills have been reported in recent years. DWR stocks the lake annually with 10,000 catchable and 30,000 fingerling rainbow trout (*Oncorhynchus mykiss*). In 1992, the fingerlings were not stocked. The lake has not been chemically treated by the DWR, so populations of native fishes are likely present in the lake.

Phytoplankton in the euphotic zone include the following taxa (in order of dominance)

Species	Cell Volume (mm^3/liter)	% Density By Volume
Asterionella formosa	5.397	90.71
Euglena sp.	0.245	4.12
Oocystis sp.	0.208	3.50
*Staurastrum gracil*e	0.086	1.44
Pennate diatoms	0.010	0.17
Centric diatoms	0.003	0.05
Total	5.706	
Shannon-Weaver [H']	0.41	
Species Evenness	0.23	
Species Richness	0.22	

The phytoplankton community is dominated by the presence of diatoms, flagellates and some green algae. This is indicative of fairly good water quality and low to moderate productivity.

Pollution Assessment

Nonpoint pollution sources include the following: sedimentation and nutrient loading from grazing; and wastes and litter from recreation. Grazing takes place around the reservoir and throughout the watershed.

There are no point sources of pollution in the watershed.

Beneficial Use Classification

The state beneficial use classifications include: boating and similar recreation (excluding swimming) (2B), cold water game fish and organisms in their food chain (3A) and agricultural uses (4).

Information

Management Agencies	
Mountainland Association of Governments	377-2262
Division of Wildlife Resources	538-4700
Division of Water Quality	538-6146
Wasatch-Cache National Forest	524-5030
Kamas Ranger District	783-4338
Recreation	
Mountainland Travel Region (Provo)	377-2262
Reservoir Administrator	
Weber River Water Conservation District	771-1677